



Course Specifications

Course Title:	Organic Reactions and Preparations
Course Code:	4023565-3
Program:	Chemistry
Department:	Chemistry
College:	Applied Sciences
Institution:	Umm Al-Qura University

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A. Course Identification

1. Credit hours: 3 h (2 theoretical + 1 practical)
2. Course type
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
3. Level/year at which this course is offered: 6 th level / 3 rd year
4. Pre-requisites for this course (if any): Heterocyclic Chemistry (4023556-3)
5. Co-requisites for this course (if any):

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	√	74%
2	Blended	-	
3	E-learning [√]	√	26%
4	Distance learning	-	-
5	Other	-	-

7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	22
2	Laboratory/Studio	30
3	Tutorial	--
4	Others (E-learning + Exams + office hours)	15
	Total	67

B. Course Objectives and Learning Outcomes

1. Course Description

This course includes description of the use of different function groups interconversions and synthetic strategies used in organic synthesis of different classes of organic compounds. Also, the course involves studying name reactions, redox reactions and selectivity, pericyclic reactions, retrosynthetic approach and chemoselectivity.

2. Course Main Objective

The course main objective is the theoretical and practical study of the different synthesis methods and reactions of different classes of organic compounds.

3. Course Learning Outcomes

CLOs		Align ed PLOs
1	Knowledge and Understanding	
1.1	Identify the theoretical background and mechanistic pathways of the different methods used in the preparation of various organic compounds	K1
1.2	Recognize the different name reactions of organic reactions including pericyclic	K2

CLOs		Aligned PLOs
	reactions	
1.3	Outline the recent synthetic methodologies that are developed in the scientific research and their applications.	K3
2	Skills:	
2.1	Demonstrate the reaction mechanisms for different organic reactions	S1
2.2	Predict the products of different organic reactions	S2
2.3	Design the different ways to prepare the functional groups of organic compounds	S1
2.4	Explain the different strategies for preparation of organic compounds	S1
2.5	Practice chemical processes and techniques for the synthesis organic compounds	S3
2.6	Collect a data using computers and internet to find all information related to pericyclic reactions and their applications	S5
2.7	Communicate effectively using theoretical basis of structural elucidation of the named reactions to a variety of audiences	S4
3	Values:	
3.1	Write and present a chemical report related to synthetic organic chemistry.	V2
3.2	work individually and in a team to perform a specific experiment or preparing a report on the organic synthesis	V3

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to organic synthesis	2
2	Chemistry of functional groups: carbonyl compounds, carboxylic acids/their derivatives, amines, nitriles, and sulfides/sulfoxides.	2 +2E
3	Named reactions: Aldol condensation - Claisen condensation – Claisen rearrangement - Friedel–Crafts acylation –Grignard reaction –Michael reaction – Wittig reaction – Suzuki coupling – Diels-Alder reaction.	2 +2E
4	Protection and deprotection of function groups: Hydroxyl group, carbonyl group, carboxylic group, and amino group	2
5	Redox reactions and selectivity	2
6	C-C bond formation: free radicals, enolates, coupling reaction	4
7	Pericyclic reactions	4E
8	Retrosynthetic approach	4
9	Chemoselectivity	4
Total		30

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	Knowledge and Understanding		
1.1	Identify the theoretical background and mechanistic pathways of the different methods used in the preparation of various organic compounds	Lectures Lab work E-Learning	Mid-term and final Exams Practical Lab exam Assignments and activities on blackboard
1.2	Recognize the different name reactions of organic reactions including pericyclic reactions	Lectures Lab work E-Learning	Mid-term and final Exams Practical Lab exam Assignments and activities on blackboard
1.3	Outline the recent synthetic methodologies that are developed in the scientific research and their applications.	Lectures E-Learning	Quizzes, mid and final exams Assignments and activities on blackboard
2.0	Skills		
2.1	Demonstrate the reaction mechanisms for different organic reactions	Lectures and Web-based E-Learning Mind Mapping	Exams long and short essays Assignments and activities on blackboard
2.2	Predict the products of different organic reactions	Lecture Scientific discussion	Quizzes, mid and final exams
2.3	Design the different ways to prepare the functional groups of organic compounds	Lectures Lab work	Quizzes, mid and final exams
2.4	Explain the different strategies for preparation of organic compounds	Lectures and Web-based Lab work	Quizzes, mid and final exams
2.5	Practice chemical processes and techniques for the synthesis organic compounds	Lab work	Lab exam.
2.6	Collect a data using computers and internet to find all information related to pericyclic and their applications	Self-Directed private Study	Assignments and activities on blackboard
2.7	Communicate effectively using theoretical basis of structural elucidation of the named reactions to a variety of audiences	Web based study. Research activity.	Class discussion Assignments and activities on blackboard.
3.0	Values		

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
3.1	Write and present a chemical report related to synthetic organic chemistry.	Research activity. Web based study.	Portfolios Assignments and activities
3.2	work individually and in a team to perform a specific experiment or preparing a report on the organic synthesis	Class discussion.	Class discussion

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	E-learning	All weeks	5%
2	Assignments and activities	All weeks	5%
3	Mid-term Exam	6	20%
4	Practical Lab Work (Reports and Exams)	11	30%
5	Final Exam.(2 hours exam)	12	40%

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

- We have faculty members to provide counseling and advice.
- Office hours: During the working hours weekly.
- Academic Advising for students.

F. Learning Resources and Facilities

1. Learning Resources

Required Textbooks	<ul style="list-style-type: none"> • T. W. Graham Solomons, Craig B. Fryhle, Scott A. Snyder "<i>Organic Chemistry, 11th Edition, International Student Version</i>" 2013, John Wiley & Sons. • J. McMurry "<i>Organic Chemistry, 8th edition, International Edition</i>" 2011, Brooks/Cole
Essential References Materials	➤ Lecture Handouts available on the coordinator website
Electronic Materials	<ul style="list-style-type: none"> • http://www.chemweb.com • http://www.sciencedirect.com • http://www.rsc.org

Other Learning Materials	Course Handouts are available as PPT
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2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom with capacity of (30) students. A laboratory with capacity of (15) students Including all practical facilities
Technology Resources (AV, data show, Smart Board, software, etc.)	Teaching halls and laboratories are equipped with data show.
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	See attached list

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching and assessment	Program leader, curriculum committee; external reviewers	Direct
Extent of achievement of CLO's	Peer Reviewer	Direct
Quality of learning resources	Students, faculty members and External reviewers	Direct

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	Quality committee and department counsel
Reference No.	
Date	2022

Head of Chemistry Department



Dr Moataz Morad

